

Lesson 8: Worksheet 8.1 – Line tracking sensor

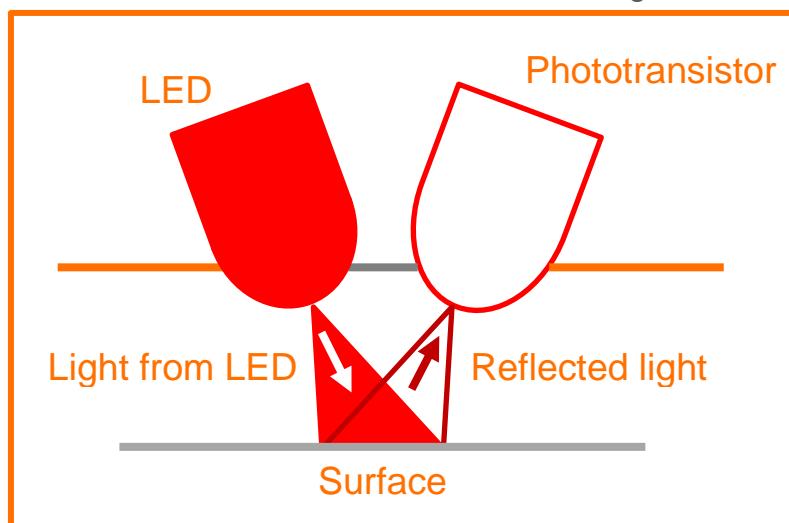
In this activity, you will learn more the Edison robot's line tracking sensor and how Edison can use this sensor to determine if it is on a reflective or non-reflective surface.

How does Edison's line tracking sensor work?

Your Edison robot is equipped with a line tracking sensor, located near the power switch on the bottom of the robot. This sensor is made up of two main electronic components:

1. a red light emitting diode (LED), and
2. a phototransistor (light sensor).

This image represents a cross-section of Edison's line tracking sensor:



The line tracking sensor's LED shines light onto the surface that the Edison robot is driving on.

The phototransistor component is a light sensor. The phototransistor measures the amount of light that is reflected back up from the surface beneath Edison.

Your turn:

Task 1: Black versus white

When more light is reflected back to Edison's phototransistor, it gives a higher light reading.

Experiment to see whether a white or a black surface will reflect back more light.

Use activity sheet 8.1 or one piece of white and one piece of black paper. Turn Edison on and press the round button twice so that the line tracking LED comes on. Lift Edison up from the paper slightly and have a close look at the round spot of light that the LED shines on the surface. Compare how bright the spot of light appears when placed on a black surface and then on a white surface.

1. Does the LED light spot appear brighter when placed on a black or a white surface?

Task 2: Red, green and blue

As you saw in task 1, there is more light reflected from a white surface than from a black surface. That's why the light appears brighter on a white surface.

When the phototransistor is on a white surface, it gives a higher light reading than when it is on a black surface. A black surface is, therefore, considered to be 'non-reflective' and a white surface is considered to be 'reflective'.

The phototransistor's ability to determine if Edison is on a reflective or non-reflective surface is what allows the robot to be programmed to respond to the surface that it is driving on.

2. Think about how the line tracker would respond to each of the following surface colours. Would the line tracker see each colour as reflective or non-reflective? Remember, Edison's line tracker LED emits red light. (*Hint: you can test your answers using activity sheet 8.1.*)

Red surface _____

Green surface _____

Blue surface _____

Video – Humans need not apply

Line tracking is a very basic robotic behaviour that is used in many automated factories and warehouses today. Will it be the same in the future? What will the workplace of the future look like with more robots? Will it even exist?



Watch the video *Humans Need Not Apply* to see more about what the widespread uptake of robots might mean for the future of humans at work:

<https://www.youtube.com/watch?v=7Pq-S557XQU> (15 minutes)